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RECENT EVOLUTION OF THE  
NUCLEAR WEAPON SAFETY PROGRAM (U)

1970 to 1985

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## PREFACE

This paper and an earlier paper by the writer\* began as a record of the evolution of Sandia's involvements in achieving safety in the electrical subsystems of nuclear weapons, motivated by the writer's desire to capture the history for his successor (before his early retirement in September 1985). The writing style selected cites contributions of specific persons in order to aid some readers in relating key events in safety evolution to their personal recollections and involvements. The scope was broadened soon afterwards to include, in sparse outline form, contributions of the Los Alamos and Livermore laboratories (e.g., in the area of one-point safety of HE/nuclear subsystems). This expansion was in anticipation of the possible use of the paper (depersonalized, of course) as a strawman source document for the first two parts of a tri-laboratories project to write a nuclear safety treatise. The treatise project is sponsored by the Safety, Security, and Control (S<sup>2</sup>C) Committee established by the DOE's Assistant Secretary, Defense Programs.

The paper is intended to be unclassified as to detail but perhaps CFRD by accumulation. Pending review by classification specialists, it should be treated as CFRD. If desired by reviewing authority at Sandia, a slightly expanded version containing classified information could be considered.

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\*"Early Evolution of the Nuclear Weapon Safety Program, 1950's and 1960's," May 1986.

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## DISCUSSION

The following discussion considers key events in the period 1970 to 1985 in the evolution of the U.S. nuclear weapon safety program.

1970-1974

### Evolution of Enhanced Electrical Safety (EES) Safety Concepts, 1968-1972

#### Project CRESCENT, 1968-1970

By September 1970, Sandia had completed a two-and-one-half-year exploratory development program, Project CRESCENT, whose objective was to establish design features and tradeoffs to provide an "accident-proof" nuclear bomb in the one-megaton yield range and suitable for use in an airborne-alert force. (The Air Force's Strategic Air Command had scaled down its airborne-alert flying program, code named "Crome-Dome," in 1966 following the Palomares, Spain, nuclear weapon accident and had discontinued it in 1968 following the Thule, Greenland, accident.) This exploratory development program was in response to a request by the AEC's Division of Military Application to stimulate the Air Force to think about the need for increased nuclear safety in nuclear weapons, and the request was directed to each of the AEC's weapon design laboratories. Project CRESCENT was a Sandia/Los Alamos team effort, and Project AMBASSADOR was a Sandia/Lawrence Livermore effort.

Project CRESCENT had two self-imposed requirements: (1) for accident situations (e.g., fire, aircraft crash/mid-air breakup, free-fall impact, or lightning strike), the

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probability of the weapon producing either a nuclear yield or a one-point detonation of the high explosives would be made as low as practicable; and (2) for incident situations experienced in "normal" use (e.g., a set of electrical malfunctions in the delivery aircraft that applied signals to the attached nuclear bomb), the probability of the weapon producing a nuclear yield would be made as low as practicable (Ref. 1). Major emphasis was on the prevention of dispersal of plutonium aerosols created by the HE detonation, and the scheme adopted was to maximize the strength of the bomb's structural case in order to set an upper bound on the penalties of containing conventional critical components within a "hard" case and thermal insulation. In brief, results of analytical studies and structural testing featuring scaled models showed that the desired improvements to prevent HE detonation would require an increased bomb diameter of several inches with proportional increase in weight--attributes probably not attractive to the Air Force. Subsequent studies to develop alternative ways to prevent HE detonation are covered later in this document.

In the weapon electrical system area, Project CRESCENT had more direct payoffs in nuclear safety evolution: namely, (1) a pulse-train-operated ready/safe switch in the bomb; (2) new aircraft monitor and control (AMAC) equipment in the aircraft to provide the pulse-train signal; and (3) hardened environmental sensing devices (ESDs) in the bomb, taking advantage of restrictions on possible arming conditions. The first-named element, the CRESCENT ready/safe switch, proved to be an early major demonstration of potential benefits of new design approaches for enhancing nuclear weapon electrical system safety--collectively termed enhanced electrical safety (EES).

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Project HOTPOINT, 1969

Currently with the conduct of the hardware-oriented Project CRESCENT, the newly formed Nuclear Safety Department at Sandia was considering broader, longer-ranged conceptual and philosophical approaches to enhancing electrical safety to prevent nuclear detonations.

By adapting their earlier work on development of a computer program intended to provide exact solutions of nuclear weapon reliability equations, department staff members calibrated in a rough sense the potential magnitude of difficulty of attempting to understand all of the ways that a practical electrical system could malfunction to produce an unsafe condition. To avoid imposition of security classification procedures on a contractor to Sandia, an unclassified schematic drawing of an electrical system was devised for use as a test bed. The system, which had switching functions considered to be reasonably representative of early U.S. nuclear weapons, was that of a hypothetical electric stove, hence the name HOTPOINT. The results of preliminary runs of the computer code (a version of Eventpoint, which featured set theory manipulation routines) on Sandia's fastest scientific computer of the time suggested that some  $10^6$  potential failure paths would have to be considered--a clearly impractical task.

Origin of a Simplifying Notion for Electrical System Safety Design, 1969-1972

By early 1969, appreciation of the basic intractability of analytical solutions of equations describing premature operation of practical electrical systems in accident environments became an impetus in the search by Sandia's nuclear safety design division's staff for a conceptual

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approach that would be judged convincing in meeting safety requirements.\* The goal was to formulate a simple pattern of behavior of electrical system hardware such that when insulated environmentally (e.g., in an accident such as a fire), behavior will be based on well-understood physical properties or principles. This approach asked not the question, "How will the system behave in a fire?" but asked, "Will the system behave in a fire in the way we have predicted beforehand?" The resultant development was the simplifying notion of "weak-link/strong-link/exclusion region," conceived by mid-1969, published internally at Sandia by spring 1970 (Ref. 2), and briefed formally to the DOD by late 1970 (Ref. 3).

Studies of Properties of Materials in Abnormal Environments,  
1969-1972

A parallel effort of Sandia's nuclear safety design division and several materials processing organizations during 1969-1972 was to investigate the properties of materials commonly used in nuclear weapon ordnance components when subjected to severe environmental insults. The early and naive goal, overstated here for emphasis, was to create a handbook which would describe such behavior analytically, for use by Sandia's weapon designers for components contained inside the exclusion region. Such a handbook would complement those widely found in engineering technical publications for

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\*To the writer's knowledge, the only attempt by Sandia at quantitative probability analysis in accidents was for an article published in the U.S. Navy's Nuclear Weapons Safety, Secret Restricted Data, publication in September 1969. This article reported an application of reliability analysis techniques to a safety situation.

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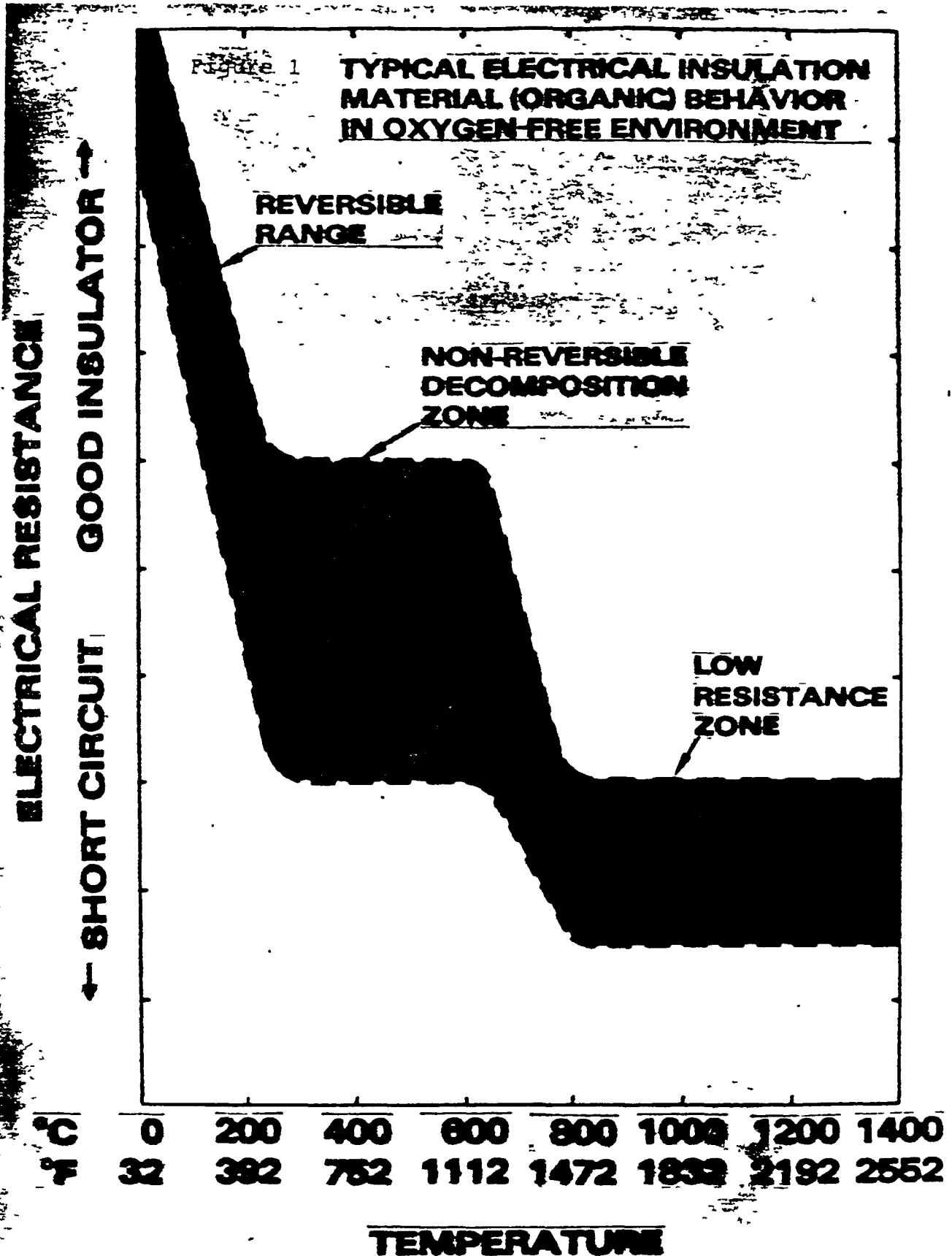
normal environments. For the first two years (1969-1971), emphasis was on the "bare" components (e.g., samples of plastic coatings for copper wires); for next one-and-one-half years (1971-1972), on "encapsulated" components (e.g., printed circuit boards surrounded by plastic to provide protection); and by early 1972, sufficient evidence existed to upset the traditional engineering understandings of behavior of electrical circuits used in weapon ordnance, when subjected to "abnormal" environments. In brief, the startling and alarming conclusion was, that for all printed circuit board/polymeric encapsulants tested, and within a specific range of temperature/time conditions, shorting between electrical circuits is to be expected because of charring phenomena. This finding in effect shattered the image of order conveyed to the designer by circuit diagrams and layouts--"unpredictability" became a buzz word of the time.

Figure 1 displays graphically the changes in electrical resistance of polymeric materials commonly used in nuclear weapon hardware. (The display is commonly called "The Kepler Curve" to honor the SNL department manager under whom the work was done, R. Glen Kepler.) Figure 2 shows photographs of a printed circuit board, one showing the board in pristine condition before being encapsulated for a test and the other showing that board after the test, which involved the flow of very high currents in a ground circuit (the top layer of encapsulant has been cut away for clarity). Charring and metal splatter caused by the high current resulted in unintended conductive paths between circuits. This particular board was used in a nuclear weapon type for which development had just been completed and some five units had been produced for stockpile. At once, Sandia's technical management urged DOE/AL to halt production and recall the units then in DOD possession but

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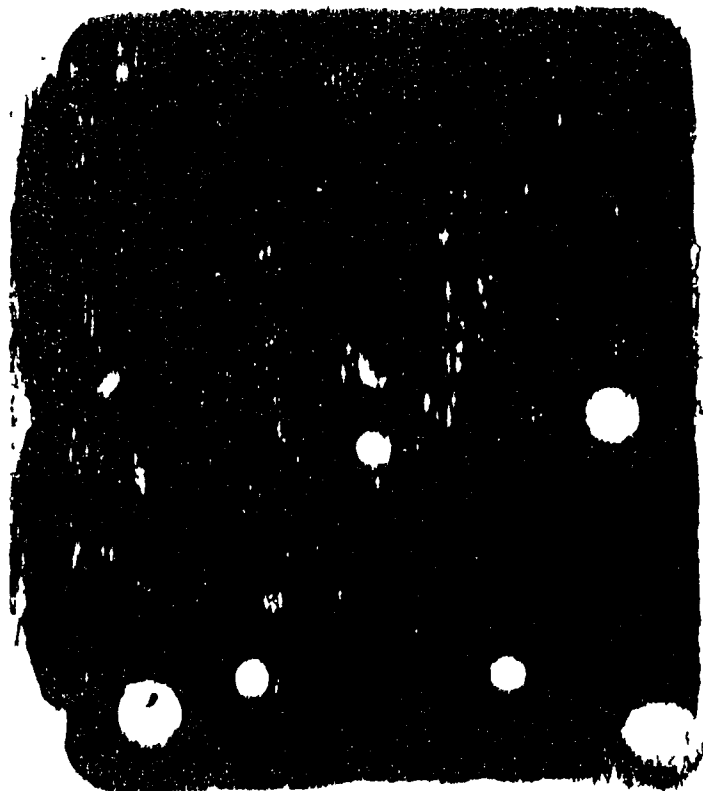
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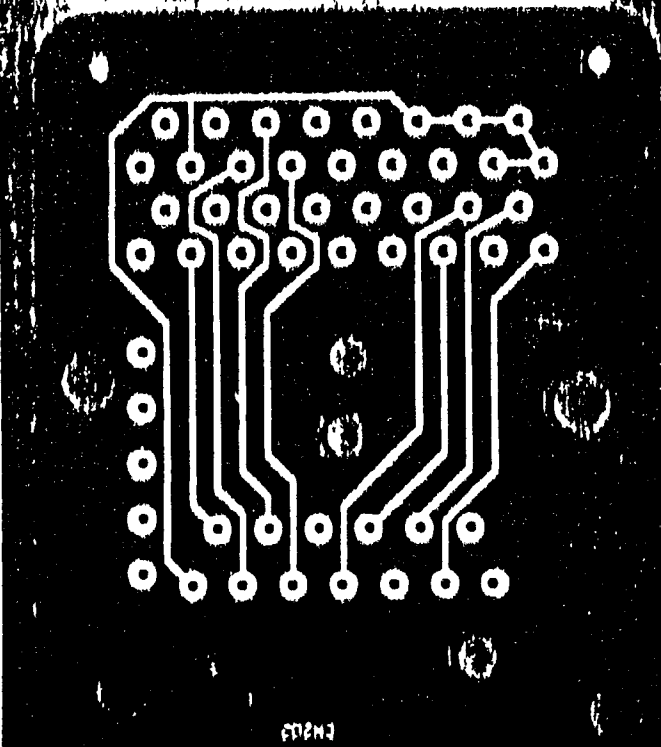


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B. Posttest Condition of  
Test B Board



A. Printed Circuit Board of  
Type Used in Test B

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not yet deployed (in the logistical "pipeline" to stockpile). A design remedy was identified, and corrective hardware (electrical fuses to prevent high current flow) was developed, produced, retrofitted into the recalled units, and incorporated in the subsequent production run.

Radioactive Material Contamination Studies, 1971-1972

In March 1971, Sandia Vice President William J. (Jack) Howard appointed a committee of three department managers to assess existing threats to nuclear weapon operations from abnormal (accident) environments from the viewpoint of increasing concern about matters pertaining to ecology. The committee focused on plutonium contamination arising from accidental or intentional detonation of a weapon's high explosives, used a risk assessment methodology to establish a perspective on threats, and concluded that the situation warranted "a vigorous contamination safety program--within the AEC/DOD complex and priority for that program should be second only to that of nuclear safety." The two most notable threat situations were identified as logistical transportation and aircraft standing alert. The final report (Ref. 5) was transmitted for internal-AEC distribution by Mr Howard on July 21, 1971.

The Sandia/Los Alamos weapon design team in Fall 1971 established a contamination safety study group consisting of three members from each laboratory "to determine what weapon design approaches are available to reduce or eliminate the contamination safety concerns," Ref. 6. The group determined that several design approaches were available (seven were examined in some detail), and its final report dated April 20, 1972, concluded that the team's approaches for the Phase 2 proposal for the High Yield Bomb (the program which evolved from the Alert Bomb/CRESCENT studies of 1969-1971) should be based on insensitive high explosives (IHE)--perhaps the plastic bonded triaminotrinitrobenzene (TATB)

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formulation then in an early development stage. The group had precluded consideration of a removable HE system, as this was being pursued by the Sandia/Lawrence Livermore team at the time.

## The SAFEGUARD Anti-Ballistic Missile System Safety Issue, 1972-1973

Whereas the governing AEC/DOD directive for nuclear weapon system safety studies and reviews (DOD Directive 5030.15) had, since 1960, required an initial safety study to be concluded early in the formal weapon system development program, the U.S. Army's Nuclear Weapon System Safety Group (NWSSG) had elected to conduct four "preliminary" safety studies during the on-again-off-again development period for the anti-ballistic missile (ABM) effort, 1965-1971. The latter type of study had no official status under the directive, and the one-hundred-or-so recommendations that the NWSSG had made had not been implemented by the time that the initial safety study was conducted on 5/25/72. By that time, the state of understanding of nuclear safety of weapon electrical systems in abnormal environments had matured to the point where Sandia's technical advisor to the NWSSG had become apprised of the unpredictability of traditional hardware/circuits, and his inputs to the NWSSG were influential in formulation of a NWSSG unanimous position that the U.S. Army's adaption kit design would not meet the qualitative standard of DOD Directive 5030.15, i.e., would not provide measures to prevent a nuclear detonation of the AEC's nuclear warhead in accident (abnormal) environments.

The negative finding on nuclear safety for the Initial Safety Study was seen as a clear threat to the time scales of the national ABM program, which by then was of high interest--in consonance with ABM treaty negotiations with the USSR. The Army's SAFEGUARD project office challenged the NWSSG's finding and arranged to present its case to Dr. Carl Walske, DOD/ATSD(AE), in 7/72. Dr. Walske requested AEC participation in

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the briefing session, and the AEC's contingent included the AEC voting member of the NWSSG (George L. Trimble) and two department managers to whom the NWSSG's technical advisors reported (D. E. Gregson of SLL for W71/Spartan and W. L. Stevens for W66/Sprint). When the Army briefer projected a slide which indicated that the nuclear safety criterion to be met was  $10^{-5}$  nuclear detonation/accident, Dr. Walske inquired forcefully how the criterion had been reduced from the standard  $10^{-6}$  nuclear detonation/accident which he personally had imposed in 1968 (Ref. 7, now commonly referenced as "the Walske letter"). The briefer explained that the  $10^{-5}$  applied to the total weapon system, and  $10^{-6}$  was still valid as a nuclear-warhead-alone criterion--the difference of  $10^{-1}$  being allocated to the Army's adaption kit, which conceptually had to cause some decrease in safety by its mere presence.

Dr. Walske objected to this seemingly legalistic violation of his intent behind  $10^{-6}$  as a weapon system requirement. He then asked the general question of whether or not even the  $10^{-5}$  value was supportable. Sandia's W. L. Stevens responded with a statement that R&D work at Sandia in the period between the preliminary and initial safety studies suggested that hardware response would be unpredictable in abnormal environments; however, the Army's  $10^{-5}$  estimate could be valid for normal environments. Indeed Stevens knew, but did not mention, that the Army's analysis had used a computer code (the "GOCODE") developed at Kaman Sciences by a person who earlier had been a staff member in Sandia's nuclear weapon reliability organization which had concerned itself only with "normal" environment premature probabilities. Stevens also reminded Dr. Walske that the MLC/ATSD(AE) staffs (including Walske) had been alerted to the abnormal environment R&D work in their visit to Sandia in 11/70 and that the AEC had earlier ceased production and recalled units produced for a nuclear weapon found by intra-AEC technical review to be deficient in this respect. Finally, Stevens offered to expedite the transfer

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of the technology base on abnormal environments from Sandia to Army design agencies, upon request. The NWSSG chairman, the late Julian S. Pulley, remarked that Stevens' proposal was irrelevant, since the NWSSG used only qualitative standards of DOD Directive 5030.15 and did not recognize the quantitative standards of the MCs!

Following the briefing, Dr. Walske issued directives which resulted in two important safety reforms:

1. The creation of a special organization to assess quantitatively the nuclear detonation safety of the total SAFEGUARD weapon system during the one-and-one-half years remaining before system deployment. The organization, suggested by Stevens to avoid the philosophical issue raised by Pulley, featured two tiers: an Army/AEC Steering Group and an Abnormal Environment Task Group to do the technical assessment.
2. The revision of the DOD directive on project liaison groups (POGs) to mandate that POGs would invariably have a nuclear safety subcommittee

and

The assignment of a staff member of the MLC/ATSD(AE) to monitor reports of POGs to identify potential safety issues early, in time to avoid threatening weapon system time scales.

The outcome of special assessment was the identification and correction of deficiencies, particularly in the Sprint missile launch circuits, and the identification of conditions which were judged to be unpredictable as to behavior in abnormal environments and uncorrectable on program time scales (Ref. 8). The latter conditions were circumvented by the adoption of a

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nuclear safety rule\* which would prevent connecting the nuclear warhead to the adaption kit until the completed missile system was about to be lowered into the silo cell. This measure, of course, resulted in an operational difficulty but was seen as essential to safe deployment.

The First Revision of the Directive for Weapon System Safety Studies, 1973-1974

Note: Volume 1 of this series of papers discussed origins of DOD Directive 5030.15 from 1959-1969.

DOD/MLC chairman, Dr. Carl Walske, supervised the first revision to DOD Directive 5030.15, Atomic Weapon System Safety Studies and Reviews (dated June 1960). His nuclear safety specialist, Captain William Sweet, U.S. Navy, did the drafting. Sandia's W. L. Stevens, manager of the Nuclear Safety Department, was contacted by Captain Sweet for informal comments on the several drafts. This several-year effort, in the opinion of the writer, had as primary motivation Dr. Walske's desire to change the coverage from peacetime operations to include high status of readiness, including war. In particular, he wanted nuclear safety rules to address the process of recovering from high readiness to normal readiness. Coverage was broadened to include all operations. The AEC/ALO successfully argued to add the (undefined) act of prearming to the existing four acts to be prevented by the four safety standards, i.e., to the four gerunds of arming, launching, firing, or releasing, without offering any written explanation.\*\* In perspective, the paucity of changes in

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\*Such a procedural positive measure was suggested to Dr. Walske by Sandia Vice-President W. J. Howard, who had preceded Dr. Walske as Chairman, MLC.

\*\*This matter continues to cause confusion and is a questionably rewarding use of time of safety study groups.

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the 8/8/74 revision testify to the merits of the original version.

Sandia Questions the Safety of Air-Delivered Weapons on Quick Reaction Alert, Fall 1974

With the advent in 1973 of unique signal concepts to complete the structure of the weak-link/strong-link/exclusion region nuclear detonation safety design concept, Sandia's safety specialists could offer to weapon development groups a capability to provide assurance that the  $10^{-6}$  nuclear detonation/accident MC requirement could be met, both for new weapon programs and for older ones in the stockpile, by retrofit. By Fall 1974, the Weapon Development Directorate 1500 under R. L. Peurifoy, Jr., had completed a review of the impact of the new understanding of abnormal environment situation on composition of the U.S. nuclear weapon stockpile and concluded that the air-delivered portion of the stockpile constituted a high safety risk which required priority attention to remedy deficiencies. Sandia's conclusions and recommendations for remedial actions were presented to AEC/OMA by a memo from Vice-President Glenn A. Fowler on 11/15/74. This memo would prove to be an event of extreme influence on the national nuclear weapon safety program--perhaps comparable only to the military's review of the stockpile in 1957, attendant to the introduction of sealed-pit nuclear weapon designs. The memo (Ref. 9) became known as "the Fowler letter," or in some DOD circles, "the Halloween letter," for its alleged sudden shock to Donald R. Cotter, then DOD/ATSD(AE).

Briefly, the Fowler letter recommended a joint ERDA/DOD program to improve the nuclear safety status of the air-delivered stockpile over the decade 1975-1985 by either retiring or retrofitting seven weapon types with a weak-link/strong-link/exclusion region safety subsystem and replacing four weapon types with weapons scheduled to be newly produced later and

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having the modern safety subsystem.\* Until these or similar actions could be taken, Sandia recommended that the Secretary of Defense be notified of the risks inherent in maintaining quick-reaction-alert (QRA) operations with the weapons and that the AEC recommend restriction of such QRA operations to missions "absolutely required for national security reasons."

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\*All of the weapon systems involved used nuclear warheads or bombs that had been designed by the Sandia/Los Alamos team. Thus, Vice-President Glenn A. Fowler, under whom Sandia Albuquerque weapon development programs were managed, was the appropriate signer. Sandia Livermore was not directly involved.

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1975-1976

## The ERDA/DOD Stockpile Safety Study, 1975-1976

On 5/6/75 the DOD/MLC approved a charter for a joint ERDA/DOD evaluation of nuclear safety for the entire nuclear weapon stockpile, this being the main response to Sandia's 11/15/84 questioning of the safety of the air-delivered portion of the stockpile. The charter was patterned directly after the AEC/DOD arrangement of 1972 for evaluation of nuclear safety of the SAFEGUARD ABM. A steering group would establish uniformity in approach among the technical working groups (TWGs) to be formed by each of the three military services and ERDA, resolve conflicts, ensure timely completion, and establish priorities of reviews for the one-year effort.

The evaluations conducted by the technical working groups are remarkable in their high quality of technical analysis and in uniformity of approach. The former may be attributed to the enlightened policy of the military services and the three ERDA weapons laboratories in making assignments to the TWGs based on technical competence rather than prior experience in the qualitative arena of system safety studies per DOD Directive 5030.15. The latter may be attributed in major part to the personal contribution of Sandians Stanley D. Spray and Jay W. Grear, who devised and successfully advocated a study methodology which produced a single definition of modern safety standards (a term contained in the charter), a rating system for weapon hardware response that categorized the degrees of safety judged to exist, and a severity-likelihood index of abnormal environments to facilitate arriving at priorities for remedial actions.

Figure 3 indicates the large magnitude of the total national effort, which became known as the ERDA/DOD Stockpile Safety Study, and the subsequent consideration of the TWG's findings by

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the Nuclear Weapon System Safety Group (NWSSG) of the military services (as required by the charter).

## The Joint Chiefs of Staff Stockpile Improvement Study, 1975-1977

Concurrently with conduct of the ERDA/DOD Stockpile Safety Study effort, an essentially independent effort was conducted under DOD auspices as a "technical review of the current, near-term and future nuclear weapon systems with respect to safety, security, command, and control (Ref. 10). As events developed, this effort focused on use control aspects of nuclear weapon systems. Nuclear detonation safety was not covered, in deference to the ERDA/DOD study. Radioactive material dispersal safety was defined to be within the scope, but nothing of consequence was done. Security, similarly, was largely ignored.

Results of the JCS Stockpile Improvement Study were not provided to ERDA/DOE, even though Sandia W. R. Hoagland had been a full-time participant, on invitation.

## The POPCORN Issue Revisited, the Study of 1975-1977

By means of a co-signed letter to AEC/DMA dated 6/13/75, officials of the Los Alamos and Livermore weapons laboratories announced that, in the past year, "a significant extension to previous analyses (1-4) had occurred," and results indicate that "there may be a problem with arrays of certain stockpiled weapons detonated in certain ways" (Ref. 11).<sup>\*</sup> This letter, which touched off a several-year major restudy of nuclear weapon storage configurations and procedures, is an example of responsible "whistle blowing" to report openly a safety-related situation that might be seen by some critics as a deficiency of performance by a contractor.

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<sup>\*</sup>Earlier POPCORN concerns and definitions are discussed in the first volume in this series.

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Although the LASL/LLL letter suggested that the restudy of the POPCORN phenomena could be included in the ERDA/DOD Stockpile Safety Study already underway, the effort was assigned to a task group chaired by the DOD/FC-DNA, with members from the DOE's LASL and LLL and various technical and liaison agencies of the military services. The final report was issued on 9/13/77 (Ref. 12).

## Plutonium Mass Limit Controversies, 1975-1976

An early initiative of Donald R. Cotter as chairman of the DOD's Military Liaison Committee (appointed in Fall 1973) was to direct the DOD's Defense Nuclear Agency to conduct a study on nuclear stockpile operating and support costs. As a part of this study, the Field Command unit of DNA (located in Livermore and then under Colonel Marvin B. Sullivan, USAF) conducted a study to examine economic, health, hazard, and political costs of long-range transportation of plutonium-bearing nuclear weapons by logistical aircraft. Colonel Sullivan used probability-versus-consequence diagrams to develop an argument that the public responsibility to the DOD demands a low-risk policy and that the number of flights should be reduced by increasing the number of nuclear weapons carried by an aircraft up to the maximum physically practicable, rather than to observe the existing Pu mass limit of 15 kilograms per aircraft. He further argued that the political risks support the position, since the risk falls as the number of flights decreases. Cost savings of about \$18 million per year were estimated.

During 1974, Colonel Sullivan presented his findings in briefing format to various persons, including an ERDA contingent in Albuquerque, NM, on 9/18/74. (This was at the request of Sandia's Executive Vice-President W. J. Howard, who had been briefed earlier.) Representatives of the ERDA weapons laboratories, principally E. H. Eyster of LASL, M. R. Gustavson

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of LLL, and R. E. Luna of SLA, argued that the more serious health hazard consequences of higher Pu mass limits, given that an accident occurs, should be factored into the considerations and that an upper limit should be imposed. On 2/15/75, a report by Colonel Sullivan recommending a 60 kilogram mass limit was presented to the DOD/MLC members; and on 3/20/75, the report was forwarded for comments to members of an ERDA study group on ERDA weapons transportation operations. This group, the Nuclear Weapon Transportation Safety Hazard Evaluation Group (NWTSHG) had been studying the subject since 1973, and its members, including Drs. Eyster and Gustavson, continued to object to the DNA arguments for relaxing limits, based on results of NWTSHG's detailed risk assessment. The NWTSHG's work, published as ERDA 77/10 in 1/77, identified air transportation of Pu-bearing nuclear weapons as a high-risk operation in ERDA operations. This report was a factor in an ERDA decision to discontinue such flights.

The MLC chairman reportedly shelved the DNA proposal, and no further action was noted until mid-1977, as discussed later in this report.

The ERDA/DOD Transfer Study--The Concept of Dual-Agency Responsibilities, 1975-1976

The Energy Reorganization Act of 1974 required a thorough review of the desirability and feasibility of transferring the military application and restricted data functions, which ERDA inherited from the AEC, to the DOD or other federal agencies. The review, commonly called "the Transfer Study," was conducted during 1975 by the participants listed in Figure 4.

During the study, Robert L. Peurifoy, Jr., the Sandia member of the Field Drafting Group and Technical Advisory Group for the Sandia/Los Alamos nuclear weapons program, requested W. L.

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Figure 4

## PRINCIPAL STUDY PARTICIPANTS "TRANSFER STUDY"

### SENIOR ERDA DOD REPRESENTATIVES

D.R. COFFER, Assistant to the Secretary  
for Nuclear Energy  
Department of Defense

C.D. STARBIRD, Assistant Administrator  
for National Security ERDA

### ERDA STUDY DIRECTOR

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### ANF LIAISON

T.R. CLARK, Executive Assistant  
to the Assistant Administrator  
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### DOD LIAISON OFFICER

Col. R.N. BRODIE, Military  
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E.G. RUBINI  
Engineer Consultants, Inc.

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Electronics Components & Energy Group  
ITT Aerospace

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### ERDA HEADQUARTERS ADVISORS

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J.A. GRIFFIN, Director  
Division of Classification

L.A. JACOBYTZ, Legal Counsel  
(Acting in behalf of the Office of General Counsel)  
Albuquerque Operations Office

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J.G. MOORE, Director  
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Los Alamos Scientific Laboratory  
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Los Alamos Scientific Laboratory  
J.L. OLSEN  
Lawrence Livermore Laboratory  
LASERS  
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MINNIE EARL HARGETT  
BECKIE MILLER  
LONDA STAPLES  
SANDY WENNER

### RD CLASSIFICATION ADVISORS

Division of Classification  
E.L. ELLMAN  
W.A. STRAUSS

### CONTRACT SUPPORT

BOOZ, ALLEN & HAMILTON, INC.  
J. REICH, Private Consultant

(Many others, including Laboratory Directors, Operations Office Managers, and their staffs contributed substantially to this study.)

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Stevens of SLA to prepare a draft working paper on the possible impacts of transfer options on the national nuclear weapons safety program. The resultant paper was reviewed by some study group participants and was a factor in the commissioning of a formal paper to be co-authored by W. L. Stevens and M. R. Gustavson of LLL. With the safety paper as a start, the authors broadened the scope to include with safety the related areas of nuclear weapon control and security (use control had been a career specialization of M. R. Gustavson) and argued that the system of obtaining joint participation of both the AEC and the DOD, called in the paper "dual-agency judgments,"\* had evolved and had served the best interests of the nation sufficiently well to warrant continuance (Ref. 13). The notion of dual-agency judgments and responsibilities was advanced in the final report.

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\*The term dual agency was coined by Gustavson, and originally in the paper's title it referred to advocacy as well as the rendering of judgments as to adequacy.

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1977-1980

For whatever causes or combination of causes, the health of the dual-agency judgment and responsibilities arrangements for nuclear safety began to deteriorate at an increasing, and serious, rate in the late-1970's. Potential contributing causes may have included the replacement of ERDA by the DOE and attendant reduction of the weapons program in the hierarchy, demise of the "watchdog" and advocate Joint Committee on Atomic Energy, retirements or other removals of long-term safety advocates such as General A. Dodd Starbird, downgrading of the role and status levels of the DOD's Defense Nuclear Agency, and changes in staffing and management interest at the MLC/ATSD(AE). There is, however, no real indication of a conspiracy or other expression of intent to degrade.

## Abortive Attempts to Reinstitute a DOD/DOE Agreement, 1976-1978

In Fall 1977, MLC Chairman Donald R. Cotter, in an economy move to reduce staff size, abolished the staff billets (officers of the military services in ranks O-6 and less) assigned to the Military Liaison Committee while retaining a staff for his other responsibilities as the ATSD(AE). In this process, the nuclear safety staff was reduced from three officers to one, and the remaining one was to be a billet assigned to the DNA, not to the ATSD(AE). Also, the senior grade level was reduced from O-6 to O-5, the lowered level being commensurate with the action officer coordination arrangement with the military services that seemingly had gained favor in the Pentagon and at DOE Headquarters. When Cotter was replaced by Dr. James P. Wade, a career DOD civil servant, in Fall 1978, the action officer arrangement was continued.

The Army's action officer at the time was U.S. Army Colonel (Retired) Joe Luger, who was an open, avowed opponent of any

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legitimacy to involvements of DOE, particularly DOE/ALO or Sandia, in matters involving nuclear weapons in DOD custody. His antics in joint ERDA/DOD meetings and his caustic writings, endorsed by the Department of the Army's Deputy Chief of Staff for Plans and Operations (DCSOPS), became so flagrant as to appear to be out of control. He managed, by non-concurrence maneuvers, to stifle attempts to formalize and endorse the dual-agency judgment practice which had been accepted as national policy via the Transfer Study. For example, in March 1976, the staff of the DOD/ATSD(AE) suggested that a Memorandum of Understanding between ERDA and DOD on nuclear weapon safety be drafted. This action terminated the intra-DOD coordination of a proposed National Security Decision Memorandum\* which had been drafted by the AEC and forwarded to the DOD/ATSD(AE) in March 1974. Following action-officer-level discussions between AEC and DOD, the AEC representative redrafted a MOU and forwarded it to DOD/ATSD(AE) on 9/29/77. The DOD/ATSD(AE) obtained comments of the military services (apparently this was the first such coordination attempt), redrafted a MOU, and forwarded it formally to the DOE for comment before submission through Office of the Secretary of Defense for final coordination and approval. This version was transmitted to the manager of DOE/ALO and the president of SNL by DOE/DMA on 5/24/78. This was the first formal opportunity to bring the matter to the attention of senior management, and W. L. Stevens was assigned by W. J. Howard to coordinate Sandia's response. The intra-Sandia coordination process included a review of the evolution of the MOU. The response was a memo of 6/20/78 from Sandia President Morgan Sparks to DOE/DMA Major General Joseph K. Bratton, which, in strong language, urged that the DOD's version be judged inadequate by DOE and that the DOE request a return to the

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\*This NSDM would replace National Security Action Memorandum 51 of 5/8/61, which had been inactivated on 2/3/69 by National Security Advisor Henry Kissinger as a part of a general reduction in older directives. The AEC's reclame to reissue NSAM 51 was not answered.

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earlier versions for which the DOE and DOD/ATSD(AE) action officers had been making excellent progress. In this process, W. L. Stevens learned that the source of the objectionable language that, in effect, would have made DOE entirely subordinate to DOD in nuclear safety--instead of DOE and DOD having the dual-agency judgment responsibilities--was the Army's action officer, Joe Luger.

Following further interactions between the DOE/DMA staff and Sandia (including another strongly worded letter from Sparks to Bratton of 8/8/78), DOE/DMA Major General Bratton personally participated in a rewrite of a PDM and a MOU, and Sparks could say, "We endorse without reservation, and support enthusiastically, your revised drafts . . . ."

The Sandia Stockpile Initiative, Fall 1977

Note: A complete, but classified, case study of the DOE/DOD Stockpile Improvement Study and its antecedent, the Sandia Stockpile Modernization Study, is contained in Ref. 14. The discussions below highlight only those aspects considered particularly relevant to the purposes of this paper.

By Fall 1977, Sandia Albuquerque's Richard N. Brodie,\* an executive staff assistant to Robert L. Peurifoy, Jr., (then Director of Weapon Development) had begun to examine the stockpile planning process, primarily from a nuclear safety and use control view, and used the ERDA/DOD Stockpile Safety Study as

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\*Dr. Brodie had, as a Colonel, USAF, served as executive secretary, DOD/MLC, prior to his retirement. Also, he had been the DOD liaison officer for the Transfer Study in 1975-1976 (see Figure 3).

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a basis. The study report (Ref. 15) developed a time-phased plan for redressing higher priority concerns by retirements, retrofits, or replacements with weapons of modern design, all within the then-planned capability of the DOE's nuclear weapons laboratories and production complex.

## The DOE/DOD Stockpile Improvement Program, 1978-1979

Sandia's stockpile initiation study was reviewed by DOE/ALO, and DOE/ALO developed a field-coordinated report which was transmitted to DOE/DMA on 8/15/78. The proposal, known as the Stockpile Modernization Study, was forwarded to the DOE/ATSD(AE) on 9/22/78. By 3/20/79, the DOD had endorsed, in principle, the goal of improving overall safety and control of the stockpile; however, DOD emphasized that replacement was the favored method. Retrofits could be considered if on a non-interference basis with weapon production. DOD accepted only two of the retrofit programs proposed by DOE, called for additional studies on ten other weapon systems,\* and recommended exclusion of 17 others for various reasons. The two field retrofit programs were approved, and a factory retrofit program became known as the Stockpile Improvement Program. While only these three hardware retrofit programs were undertaken, objectives for six were achieved over time by changes deployments and early retirements.

## The Starbird Study, 1979-1980

A second major review of the U.S. nuclear weapon program as regards DOD and DOE responsibilities and working arrangements was conducted in 1979-1980 and was known as the DOD/DOE

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\*The Army, reportedly led by nuclear safety action officer Joe Luger, proposed an alternative to the DOE's proposal for the W31, and a lengthy intra-Army review was initiated. This proposal did not survive.

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Long Range Resource Planning Group or "Starbird Study." Figure 5 is a list of participants in the study.

Early in the study process, Robert L. Peurifoy, Jr., a member of the study group on weapon acquisition, requested W. L. Stevens to brief the group on the nature and state of the U.S. nuclear weapon safety program. (Annotated vugraphs used are contained in Ref. 16.) The thrust of Stevens' remarks was that, whereas the national policy documents which had formed the basis for the joint DOD/DOE program had been rescinded, revoked, replaced, or otherwise de-emphasized, the program was continuing to function. Such a situation seemed fragile for the long run and not in the spirit of the finding for dual-agency responsibilities for safety per the Transfer Study of 1976. LTG Starbird, a long-time advocate of nuclear safety and a sponsor of the Transfer Study, decided to add the subject of nuclear safety to the charter of the group. Perhaps the most telling indication of fragility was a presentation by Stevens which compared side-by-side the wordings of the final draft proposals of the DOE/DMA for a Presidential Decision Memorandum and a DOD/DOE Memorandum of Understanding and of the then-current DOD draft that, almost a year later, was still circulating at action-officer levels in the DOD.\* It was clear to some in the audience that a serious threat to the dual agency nuclear safety program might be emerging.

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\*As mentioned, Joe Luger had heavily influenced the DOD draft.

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## STUDY GROUP I\*

## Fig. 5 PRINCIPAL PARTICIPANTS "STARBIRD STUDY"

| <u>RANK</u> | <u>NAME</u>          | <u>PARENT ORGANIZATION</u>            |
|-------------|----------------------|---------------------------------------|
| MGen        | John C. Toomay       | ATSD(AE) -- USAF (Ret.)               |
| Col         | Kyle D. Barnes, Jr.  | HQ AFSC, USAF                         |
| Lt Col      | Randall E. Beaty     | HQ DNA                                |
| Maj         | Roger S. Case, Jr.   | HQ USAF/RDPT                          |
| RADM        | Glenwood Clark       | USN, Strategic Systems Project Office |
| Mr.         | Thomas Clark         | DOE/ALO                               |
| Lt Col      | Jimmy W. Cotner      | HQDA, ODCSRDA, SRAO                   |
| Mr.         | N. S. Dienes         | DOE/ALO                               |
| Capt        | Leslie J. Horn       | USN, HQ Naval Material Command        |
| Mr.         | W. J. Howard         | Sandia Laboratory                     |
| Dr.         | Hugh R. Lehman       | LANSL                                 |
| LCDR        | George W. MacPherson | USN, Strategic Systems Project Office |
| Mr.         | H. N. Meyer, Jr.     | DOE/ALO                               |
| Mr.         | R. L. Peurifoy, Jr.  | Sandia Laboratory                     |
| Dr.         | Gough C. Reinhardt   | LLNL                                  |

## STUDY GROUP II\*

|        |                    |                   |
|--------|--------------------|-------------------|
| BGen   | David M. Mullaney  | ATSD(AE)          |
| Capt   | D. M. Alderson     | USN, OSG/CNA      |
| Capt   | Wayne L. Beech     | USN, DOE/OMA      |
| Dr.    | Richard N. Brodie  | Sandia Laboratory |
| Lt Col | Martin D. Centala  | USAF, HQ DNA/SOPR |
| Mr.    | Nelson W. Eaton    | OSD(C)            |
| Mr.    | John A. Eisele     | OSD(PA&E)         |
| Dr.    | Sydell Gold        | LLNL              |
| Mr.    | David J. Hessler   | OSD(C)            |
| Dr.    | Reynaldo Morales   | LANSL             |
| Col    | William A. Myers   | USAF, OATSD(AE)   |
| Col    | E. Nelson O'Rear   | USAF, AF/XOXFS    |
| Lt Col | William M. Raymond | USA, NCA          |

## STUDY GROUP III\*

|        |                     |                                   |
|--------|---------------------|-----------------------------------|
| Dr.    | F. Charles Gilbert  | DOE                               |
| Dr.    | Delmar W. Bergen    | ATSD(AE) -- on loan from LANSL    |
| Mr.    | Vladimir Berniklau  | ALO                               |
| Cdr    | Barry S. Birch      | USN, Joint Cruise Missile Project |
| Ms.    | Mary G. Carlyon     | ALO                               |
| Lt Col | Edward V. deBoeser  | USA, JCS                          |
| Mr.    | Howard B. Ellsworth | OSD(R&E)                          |
| Mr.    | Larry F. Forsythe   | DOE/OMA                           |
| Dr.    | Paul W. Keaton      | LANSL                             |
| Mr.    | William M. Lamb     | DOE/ASDP                          |
| Mr.    | Billie C. Moore     | DOE/NVO                           |
| Dr.    | Walter E. Nervik    | LLNL                              |
| Dr.    | Richard L. Wagner   | LLNL                              |

\*Most participated on a part time basis only.

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Fig. 5, cont.

1. The Steering Committee consisted of the following members:

DOD

RADM P. Carter, OP-65  
MG R. Cody, DNA  
BG J. Chain, AF/XOX  
BG N. Fulwyler, DAMO-SS  
BG D. Mullaney, DATSD(AE)  
BG D. Vesser, JCS/J-5

DOE

MG W. Hoover, OMA  
Dr. F. C. Gilbert, NMP  
Mr. H. Roser, ALO

2. The Senior Consultants were:

Mr. N. Augustine, Martin-Marietta Aerospace  
MG J. Bratton, USA CORP of Engineers  
Dr. E. Fubini, Chairman, DSB  
Dr. W. Kaufmann, MIT  
Dr. D. Kerr, LANSL, DOE  
Dr. M. May, LLNL, DOE  
Mr. G. Moe, PSR (Executive Secretary)  
Mr. P. O'Deen, Coopers & Lybrand  
Mr. H. Roser, ALO, DOE  
Dr. J. Ruina, MIT  
Dr. G. Tape, President, Associated Universities, Washington, D.C.

C. In addition to the Steering Committee and the Senior Consultants, more than 50 people were involved directly in the conduct of the study. Their names and parent organizations are as follows:

STUDY DIRECTOR AND STAFF

| <u>RANK</u> | <u>NAME</u>         | <u>PARENT ORGANIZATION</u>                            |
|-------------|---------------------|---|
| Lt Gen      | Alfred D. Starbird  | ATSD(AE) -- USA (Ret.)                                |
| VADM        | Patrick J. Hannifin | ATSD(AE) -- USN (Ret.)                                |
| Dr.         | Theodore Gold       | ATSD(AE) -- on loan from Sandia Laboratory, Livermore |
| Maj         | John W. Riggs       | USAF  |
| YNC         | James J. Taylor     | USN   |
| YN1         | James B. Jones      | USN   |
| SSGT        | Robert S. Childress | USA   |
| Mrs.        | Mary Jane Kelley    | USAF  |
| Miss        | Suzanne Carrington  | USA   |
| Miss        | Diane Offenbacher   | USN   |
| Mrs.        | Cheryl Richardson   | DOE   |
| Mrs.        | Tracey Nelson       | DOE   |

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1981-1985

This period in the evolution of nuclear safety in the U.S. nuclear weapon program is characterized by a recovery from the weaknesses in stewardship for  $S^2C$  in evidence during the 1977-1980 period. Although the recovery surely was the result of a combination of events, the foundations were drawn from the reaffirmation of the dual-agency responsibilities concept by the Starbird Study.

The DOD/DOE Plutonium Dispersal Analysis Group, 1977-1981

After a several-year hiatus, the issue of increasing the limitation on the quantity of plutonium-bearing nuclear weapons allowed to be in an ensemble for logistical storage or transportation was revived. On 7/28/77, DOD/MLC Chairman Donald R. Cotter announced that the MLC had approved an increase for storage\* that roughly amounted to 500%. The DOD/DNA Headquarters tasked its Field Command at Kirtland AFB to "take the necessary action to change TP 20-7 to conform . . . ." The TP 20-7 Nuclear Safety Criteria is a technical manual published through the Joint Nuclear Weapons Publication System (JNWPS), and any change to it requires the concurrence of at least three agencies: a military service, the DOD via its DNA, and the DOE via DOE/AL. Obtaining concurrence of the last-named also involves concurrence by the appropriate combination of the DOE's weapons laboratories. The DOE declined to concur, and the matter quickly escalated in DOD/DOE management-level attention.

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\*The thrust of DNA's arguments in the mid-1970's was to increase limit for transportation, and no mention was made of storage concerns. Apparently, the impetus here was to accommodate higher density storage in certain igloos while others underwent physical security construction upgrades.

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Attempts to accommodate the DOD's desires for economics and the DOE's concerns about safety continued for about a year, mostly in the form of wordsmithing exercises for the text and footnotes of TP 20-7. The three DOE weapons laboratories held fast to the conviction that the proposed blanket increase was ill-advised and suggested as an alternative that each specific situation should "require evaluation of the peculiarities of the particular site by technically qualified persons who consider the hazards both to the individuals at site boundaries and to the general populace" (W. J. Howard, SNL, per Ref. 17). This position was presented to the MLC orally on 10/4/78 by Jack R. Roeder of DOE/AL and Dr. Robert E. Luna of SNLA.

In Spring 1979, Sandia responded to an urgent request from the U.S. Navy for evaluation of the potential health consequences of an accident/incident involving plutonium-bearing nuclear weapons which might be stored at a site under construction in Hawaii.\* This work led to refinements of an analytical technique for quantifying consequences in terms of doses of radioactive materials dispersed by an accident, giving additional credence to the site-specific approach advocated by the DOE. In Fall 1979, the techniques were applied by Sandia to two sites in Europe and one in the CONUS, at the request of DOD/DNA.

On 11/1/79, James P. Wade, DOD/ATSD(AE), tasked the DOD/DNA to contract for a definitive study of storage of plutonium-bearing nuclear weapons. About a year later, DNA produced proposed terms of reference (TOR) for a joint DOD/DOE review of the plutonium mass limits issue, and this TOR was forwarded to DOE/DMA's MG William W. Hoover for comments. Sandia President Morgan Sparks' letter (Ref. 18) to MG Hoover early in 1981 objected to the TOR approach as favoring unilateral DOD control of the joint review

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\*This matter became the subject of litigation between the Navy and groups of intervenors, and the case was eventually decided by the U.S. Supreme Court in favor of the Navy's position.

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and suggested joint conduct of a systems study using the analytical methodology developed by the DOE weapons laboratories in 1973-1977 for the DOE's Nuclear Weapon Transportation Safety Hazards Evaluation Group and applied by Sandia to certain DOD transportation operations in the Forward Look study of 1980. The study would be conducted in a format similar to that used for the SAFEGUARD ABM issue of 1972-1973 and the ERDA/DOD Stockpile Safety Study of 1975-1976. A proposed charter was attached to Sparks' letter. The Sandia approach was endorsed by MG Hoover, and the proposed charter was forwarded to the DOD/ATSD(AE) on 3/18/81. Following further coordination of the charter, the first meeting of the DOD/DOE Plutonium Dispersal Analysis Study Steering Group was held on 8/20/81.

The DOD/DOE Memorandum of Understanding, 1982-1983

After completing his work as executive assistant for the Starbird Study in early 1980, Dr. Theodore Gold terminated his employment with Sandia (from a leave of absence) and became a deputy to Dr. Richard L. Wagner, DOD/ATSD(AE). In this assignment, Dr. Gold became the implementer of a principal recommendation of the Starbird Study that he had helped to draft:

Finding #7: The concept of dual-department responsibility for S<sup>2</sup>C of nuclear weapons needs Presidential-level reaffirmation. There is no governing policy directive now in force and no integrated management.

Recommendation: Treat S<sup>2</sup>C as an entity. The DOD and DOE Secretaries should continue to seek a Presidential Directive reaffirming dual-department responsibility and should establish, under ATSD(AE) and ASDP, and dual-agency oversight group to write the yearly safety report to the President, and also to advise and consult concerning the S<sup>2</sup>C program. ATSD(AE) should take the initiative to write a definitive, integrating DOD Directive. DNA should provide technical support to ATSD(AE) on S<sup>2</sup>C efforts.

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Dr. Gold chose to abandon attempts to draft a Presidential Decision Memorandum (PDM) and focused instead on drafting a Memorandum of Understanding (MOU) between the DOD and the DOE which would cover the entire area of joint nuclear weapons activities. Safety, security, and control (S<sup>2</sup>C) would be just one of the responsibilities considered. This enlightened approach allowed re-endorsement of existing working arrangements (principally, the 1953 Agreement Between the Atomic Energy Commission and the Department of Defense for the Development, Production, and Standardization of Atomic Weapons) and the precedents that had evolved over three decades.

In effect, Dr. Gold's draft captured the intent (he actually used some wording verbatim) of NSAM 51 of 1961 for nuclear safety and adopted current practice for use control and security as continuing responsibility. The applicable text from the MOU which became effective on 1/17/83 follows:

- E. The obligation of the DOD and the DOE to protect public health and safety provides the basic premise for dual-agency judgment and responsibility for safety, security and control (S<sup>2</sup>C) of nuclear weapons. This check-and-balance role shall continue. The DOD and the DOE share the responsibility to:
  - 1. Identify and resolve health and safety problems connected with nuclear weapons. In particular, the DOE has continuing responsibility to participate with the DOD in the consideration of these health and safety problems for nuclear weapons in DOD custody.
  - 2. Prevent unauthorized use of a nuclear weapon through the use of positive control measures. In general, the DOD establishes operational requirements and develops and implements procedures to ensure control of nuclear weapons while the DOE develops control hardware features. The DOD and the DOE jointly participate in assessing the effectiveness of control features.

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3. Determine the adequacy and effectiveness of physical security measures and to coordinate their efforts including exchanging technical and operating data. Physical security--the prevention of unauthorized access to nuclear weapons and nuclear weapons parts--is primarily the responsibility of the Department having custody.

Source: Reference 19.

## The Second Revision of the DOD Directive on Nuclear Weapon Safety Studies, 1983-1984

Following issuance of the DOD/DOE MOU in 1/83, Dr. Glen T. Otey, DOD/OASTD(AE)\* intensified the process of revising DOD Directive 5030.15, Safety Studies and Reviews of Nuclear Weapon Systems of 8/8/74. This document is considered to be remarkable among joint agency directives in that it has remained unchanged in thrust since original issuance in 6/60; however, its updating was needed to change organizational titles and responsibilities and to codify practices which had evolved. Dr. Otey's approach over almost two years of coordination was to have one-on-one sessions with the chairman of the military services' system safety study groups, the branch chiefs at the DOD/DMA, the DOE/AL and DOE/DMA safety groups, and the various action officers in the Pentagon. Informally, he obtained inputs and comments from others, including R. N. Brodie, F. J. Murar, and W. L. Stevens of SNL. By late-1983, a new version had been coordinated, and it entered the approval chain the DOD in early 1984.

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\*Otey had been a department manager at SNL and was on leave of absence for this assignment.

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The version (dated 2/8/84 and renumbered as DOD Directive 3150.2) makes at least two significant improvements, in the opinion of the writer.

1. The DOD/ATSD(AE) was assigned overall responsibility for the nuclear weapon system safety program, marking the first time that this responsibility was formally fixed on anyone. The responsibility ". . . review and evaluate periodically programs established to implement this directive" is derived from an internal DOD memo from the Secretary of Defense and is responsive to recommendations of the Starbird Study.
2. Reports on safety studies and reviews will contain a statement of the action which the cognizant military service intends to take on each recommendation and will be forwarded into DOD/DOE channels within four months of study completion. This provision should end the Army's practice since the mid-1970's of not publishing reports and intended actions for long periods--several years had become typical.

The revision was not successful in at least two respects, in the opinion of the writer, despite extraordinary effort by Dr. Otey:

1. Early drafts of the revision provided a safety standard addressing the prevention of radioactive material dispersal in weapon accidents, as well as to continue the charge to prevent a nuclear detonation. Although this "fifth standard" did not survive, the revision does have a weaker charge: "Measures for reducing hazards that could lead to detonation of the warhead high-explosive, ignition of rocket motor propellant, or other events of serious consequences also shall be considered . . . ."

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2. The paradoxical situation of requiring final approval of nuclear safety rules before a weapon system can become operational, and thus before one can determine if the system's military service operators really appreciate, understand, and implement those rules, was allowed to remain. R. N. Brodie's suggestion to require initial and final approval was not adopted.

The practical effect of No. 1 directly above seems, at this writing, to force the DOD/DOE Plutonium Dispersal Analysis Group activity to become institutionalized as a continuing function, rather than the two-year, ad hoc arrangement envisioned.

## National Policy Established for Use of Insensitive High Explosives (IHE) to Prevent Dispersal of Plutonium, 1984

By a policy statement issued on 4/28/84, the DOD/ATSD(AE) stated that new nuclear weapons would use insensitive high explosive unless a compelling argument to the contrary could be advanced by the cognizant military service.

## The President's Blue Ribbon Task Group Study, 1984-1985

A third major review of the U.S. nuclear weapons program as regards DOD and DOE responsibilities and working arrangements was conducted in 1984-85, the President's Blue Ribbon Task Group on Nuclear Weapons Program Management. Figure 6 is a list of participants in the study.

The subject of nuclear weapons safety, security, and control (S<sup>2</sup>C) was of interest from the beginning of the study. The DOE national laboratories' member of the secretariat, Robert L. Peurifoy, Jr., vice-president at SNLA, requested W. L. Stevens to join with LTC Michael Saunders, USAF, of the task group's

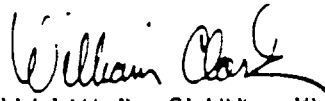
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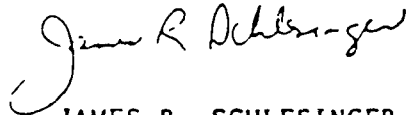
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TASK GROUP MEMBERS

  
WILLIAM P. CLARK, JR., Chairman  
Lawyer, Rogers and Wells

Former Secretary of the Interior  
Former Assistant to the President for National Security Affairs  
Former Deputy Secretary of State

Fig. 6.  
Principal Study Participants  
President's Blue Ribbon  
Task Group Study



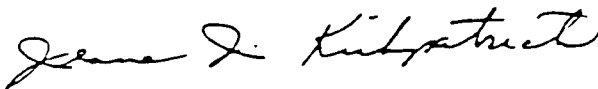
JAMES R. SCHLESINGER, Vice Chairman  
Executive Board Member and Counselor, Georgetown University  
Center for Strategic and International Studies  
Former Secretary of Energy  
Former Secretary of Defense  
Former Chairman of the Atomic Energy Commission  
Former Deputy Director of the Bureau of the Budget



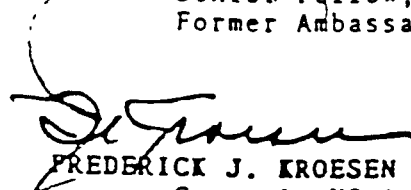
HAROLD M. AGNEW  
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Former Director of Los Alamos National Laboratory



ALAN C. FURTH  
Vice Chairman and Director, Santa Fe Southern Pacific Corp  
Chairman and Director, Federal Reserve Bank of San Francisco



JEANE J. KIRKPATRICK  
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Former Ambassador to the United Nations



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Former Commander in Chief, US Army, Europe



WILLIAM J. PERRY  
Managing Partner, H&Q Technology Partners  
Former Under Secretary of Defense for Research and Engineering

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executive secretariat in preparation of a backgroup draft working paper on the evolution of S<sup>2</sup>C for the nuclear weapons program.

The product of the Saunders/Stevens collaboration and reviews within the executive secretariat, a nine-page narrative with annexes on definitions of terms and recent S<sup>2</sup>C initiatives, was published in the final reports of the executive secretariat (Ref. 16, Volume IV, Part 1).

The task group devoted one of its nine conclusions and recommendations to S<sup>2</sup>C, as follows:

8. The President might consider issuing a directive . . . reaffirming the DOD/DOE dual-agency (checks and balances) responsibilities for nuclear weapon safety, security, and control.

Source: Reference 17.

In arriving at this recommendation, the task group used a case study on the Stockpile Improvement Program (SIP) (Ref. 14, written by R. N. Brodie) as a vehicle to examine the recent effectiveness of the dual-agency working arrangements for S<sup>2</sup>C contained in the Saunders/Stevens paper. In brief, the task group was distressed by the observation that implementation of the SIP had taken over five years and made a recommendation to strengthen high-level oversight of S<sup>2</sup>C via a new Presidential directive.

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Volume I      Nuclear Weapons Program  
Volume II      Previous Studies  
Volume II      Appendix - Previous Studies  
Volume III     Recent Initiatives  
Volume IV      Nuclear Program Responsibilities Part 1 -  
                 Safety, Security, and Control of Nuclear Weapons

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Appendix 1 - Requirements Issues, SRD

Safety, Security, and Control  
Safety, Security, and Control Background  
Stockpile Improvement Program  
Nuclear Weapon Surety - Annual Report to the President  
Dual-Agency Judgments  
Safety, Security, and Control Oversight

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